PERI-ARTERIAL SYMPATHECTOMY

REPORT OF THREE CASES IN WHICH IT FAILED

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To Leriche belongs the credit not only of being the first to suggest, but also of being the first to apply peri-arterial sympathectomy in the treatment of the rebellious forms of tropho-neuroses. The operation is simple. It is without danger. It requires no elaborate technic and it is easy to execute. As devised by Leriche, it consists of (1) exposure of the selected artery by an appropriate route; (2) removal of 1½ to 2 inches of the loose areolar tissue from the tunica adventitia. Step two is the essential portion of the operation and is accomplished by making encircling incisions around the vessel at the upper and lower limits of the site chosen for the denudation and by connecting these with a conveniently placed vertical incision. It is of the utmost importance that none of these cuts dip too deeply into the arterial wall, else a traumatic aneurism may result. The tissue thus outlined is now stripped off the tunica adventitia in thin slices or in a single piece, either by blunt or sharp dissection, thereby severing the sympathetic nerves lying beneath it and coursing along the artery. This break in the continuity of the peri-arterial sympathetic plexus is followed according to Leriche by a dilatation of the vascular tree distal to the decorticated area and by an increased blood supply, with a coincident improvement in the nutrition to the affected parts. It is to these effects that he ascribes the beneficial action of the operation. Up to 1921, he had performed this operation on 64 patients, for the following conditions:[1]

Causalgia, 11 times; painful stumps, 2 times; post-traumatic contractures, 19 times; trophœdema, 1 time; post-traumatic œdemas, 4 times; ischæmia, 4 times; trophic slough on stump, 1 time; trophic slough after nerve section, 10 times; trophic slough of heel after medullary injury, 1 time; varicose eczema, 1 time; trophic trouble after frost-bite, 1 time; spasmodic paralysis, 1 time; to modify tension of cerebrospinal fluid, 3 times; Jacksonian epilepsy, 2 times; goitre, 1 time; intermittent claudication, 1 time; erythromelalgia, 1 time.

In some instances he obtained remarkable successes, and on other occasions he had complete failures. The operation failed in the case of intermittent claudication; in one case of trophic trouble after frost-bite; in one case of spasmodic paralysis, and in some cases of painful syndromes like erythromelalgia. In nine cases of causalgia after war wounds, he reports, two failures, two improvements and five excellent results. In certain painful crises preceding gangrene caused by endarteritis obliterans with or without

[1] Leriche: Annals of Surgery, Phila., 1921, vol. lxxiv, p. 385.

intermittent claudication, it has given the same good results as in painful acroparæsthesia, consecutive to bruising of a finger, to wounds of the hand, palm, or sole of the foot. He performed it twice in Raynaud's disease, with satisfactory results. In painful stumps, it gave one success and one failure. In three cases of trophœdema, a rapid diminution of the œdema resulted. In trophic diseases leading to œdema, arterial decortication proved very efficacious; twelve out of thirteen cases were followed by rapid healing. In some cases of trophic lesions consecutive to a section of a nerve, the results were excellent. In ten such cases he obtained rapid healing of the ulcer.

Farther on in the same article, he says, the post-operative vasodilatation being lasting, peri-arterial sympathectomy can be utilized to help the insufficient circulation, for instance, in endarteritis obliterans.

The literature contains a number of papers by thoroughly competent and reliable observers extolling the virtues of arterial decompression. With the testimony of such witnesses the procedure must have a measure of value when applied to properly selected cases. The big question is, what cases may be considered as coming under this category? As yet too few adverse reports have found their way into print to serve as a starting point for the solution of this problem. The following case histories represents the experience of the surgical staff at the University of Maryland with the operation.

CASE I.—The patient, a white male, age thirty-six, entered the hospital, March 9, 1924, with a beginning gangrene of the right foot. Four years previously, he had had his left thigh amputated for thrombo-angiitis obliterans. Some six months before, he had begun to suffer with pain in his right foot. This increased gradually in severity and at times for the preceding three months had been almost unbearable. It was worse at night and exaggerated by exercise. Occasionally the foot had become greatly swollen, without apparent cause. Examination revealed a decidedly purplish mottling of the foot. When elevated the foot became pale and on lowering cyanotic. It was tender and very painful. Its anterior half was of a dusky red color, but not swollen. Passive motion increased the pain and blanched the foot; when stopped the capillaries refilled rapidly and the foot quickly assumed its erstwhile cyanotic hue. Heat or cold, when applied to the foot, caused intense pain. The diagnosis was gangrene of the toes consecutive to a thrombo-angiitis obliterans.

On March 12, 1924, the popliteal artery was exposed at its upper third and a circumferential layer of areolar tissue peeled off the tunica adventitia for a length of two inches. For a few days, it looked as though the operation had accomplished some good. The pain was less severe and the foot appeared warmer. The improvement was, however, quite fleeting; and the symptoms then returned with greater severity than ever. Fearing that the intervention had not been done at a sufficiently high level, the operation was repeated, April 15, 1924. This time the incision was made through Scarpa's triangle and the common femoral artery denuded with a technic exactly similar to that employed above, but with results equally as unsatisfactory. Owing to constantly increasing symptoms on May 10, 1924, a mid-thigh amputation was performed. The pathologist reported that specimens taken from the femoral artery showed extensive thickening of the arterial wall, thus confirming the clinical diagnosis of thrombo-angiitis obliterans. After both of these operations, the femoral and popliteal arteries contracted down to half their original size and ceased to pulsate below the site of denudation, thus conforming to the signs of a properly executed operation as laid down by Leriche.

CASE II.[2]—The patient, a white male, age thirty-eight, was admitted to the hospital, February 26, 1924, for Raynaud's disease of the left foot. In June, 1923, he had had the large and small toes of this foot amputated for gangrene. From that time he had constantly suffered with what he described as a drawing sensation in his left foot. It was constant and present both day and night, but of equal intensity. It was less noticeable when walking. The foot had periods of alternate heat and cold. The big and little toes were missing. The second toe was purplish in color. On the under surface at the extreme tip of the distal phalanx was a small opening from which an occasional drop of pus escaped. The blood Wassermann was negative. Examination of the spinal fluid gave a positive globulin reaction, a cell count of two, and a negative Wassermann. The gold curve was of normal type. The condition was diagnosed as Raynaud's disease and a peri-arterial sympathectomy suggested.

Accordingly on March 1, 1924, a vertical incision was made in Scarpa's triangle, the common femoral artery exposed, and denuded for a distance of two inches. Here again, the artery contracted at the operative site and ceased to beat distally, indicating a properly executed technic, but no benefit followed. Therefore, on March 20, 1925, the second toe was amputated at its metatarso-phalangeal articulation, under a 2 per cent. procaine anæsthesia. A microscopical examination of sections showed necrosis of the terminal phalanx of the second toe of the left foot; the bone, connective tissue and skin all being involved in the process.

On November 4, 1924, this man was readmitted to the hospital, with an ulcer of the stomach, for which he took the Sippy treatment. In this connection, it is interesting to speculate concerning the possible bearing of the Raynaud's disease upon the appearance of the stomach lesion. Were the same forces at work in the two, or were their presence in the same case merely coincidental? Admittedly, the spasm of the duodenal vessels with the associated tissue anæmia, could readily cause metabolic disturbances of such a character as to produce an absorption of the intestinal wall. Telford and Stopford[3] report a somewhat comparable case. Their patient was a man with an eleven-year history of thrombo-angiitis obilterans, who was operated on successfully for a perforated duodenal ulcer. These cases may throw some light on the factors underlying the formation of gastric and duodenal ulcers. In view of the investigations made recently by Berlet[4] on the distribution of the arteries to the various parts of the stomach, this seems all the more probable. This author found that the course of the vessels differs at the pyloric end from the distribution on the anterior and posterior surfaces of the stomach. In the pars pylorica very delicate arterioles run parallel to its longitudinal axis and exhibit hardly any anastomoses, while elsewhere the vessels extend almost vertically over the gastric parietes and inosculate freely.

CASE III.—The patient, a white male, age sixty-four, was admitted to the hospital, May 2, 1924, for a gangrenous second toe of the left foot. About five months before, he had begun to suffer with cold and painful feet. A little later he noticed that the second toe of the left foot had commenced to turn dark. He had had much treatment, both local and constitutional, but to no avail. Examination at the time of admission showed a gangrenous second toe of the left foot and the contiguous structures were red, œdematous, and swollen as high as the ankle. No pulsation was felt in the dorsalis pedis artery, but a weak pulse was perceptible in the popliteal. The general arterial tree was moderately sclerosed. With the exception of the above findings the man was apparently healthy. The condition was diagnosed as thrombo-angiitis obliterans with

[2] Case also reported by Friedenwald, J., and Love, W. S., Jr. Jour. Amer. Med. Assn., 1925, vol. lxxxv, pp. 83–85, Raynaud's Disease Complicated with Gastric Ulcer.

[3] Telford and Stopford: Br. Med. Jour., Lond., 1924, vol. ii, p. 1035; abst. in Surg., Gyn. and Obst., Chicago, 1925, vol. xl, supplement, Internat. Abst. of Surgery, p. 414.

[4] Berlet: Zeitschr. f. Pathol., 1924, vol. xxx, p. 472; abst. in Surg., Gyn. and Obst., Chicago, 1925, vol. xl, supplement, Internat. Abst. of Surgery, p. 372.

beginning gangrene of the left foot and a peri-arterial sympathectomy suggested as offering the best chance for saving the foot.

Operation—May 6, 1924, ether anæsthesia. The common femoral artery was reached by a vertical incision through Scarpa's triangle and deprived of its superficial layer of areolar tissue over a length of 1½ inches. The vessel immediately contracted down to half its original size throughout the entire extent of its denudation and there was no visible or palpable pulsation below the operative site. No relief followed. The man complained of the pain in his foot more bitterly than ever and the gangrene continued to spread. With no appreciable evidence of relief in sight, a mid-thigh amputation was done, May 14, 1924, with complete satisfaction to the patient.

Peri-arterial sympathectomy has been performed four times on three patients at the University of Maryland, thrice for thrombo-angiitis obliterans with gangrene of the toes, and once for Raynaud's disease of the foot. Not once did the operation exert the slightest influence over the progress of the disease, all three patients having subsequently to undergo amputations. In no instance can the failure be blamed on a faulty technic; for in each case, the artery contracted down to a mere thread throughout the entire extent of the denudated area and ceased to pulsate both to sight and to touch beyond the operative site, the occurrence of which phenomena according to Leriche is proof positive that the decortication has been properly executed.

With the information in hand, nobody can forecast what the future has in store for peri-arterial sympathectomy. Its acceptance or rejection is contingent upon later developments. Therefore any facts with a bearing on the subject—be they favorable or detrimental—should be of genuine interest to the profession, especially as the methods hitherto used in combating these affections have been found wanting. From present indications peri-arterial sympathectomy is worthless in senile gangrene, in ascending neuritis, in erythromelalgia; in causalgia and in trophic ulcers the results are more favorable, but undependable. Jeanneney and Mathey-Cornat [5] recommend it as one of the best indirect methods for securing a prompt cure of varicose ulcers, but it leaves the cause untouched, consequently recurrence is likely. On the few occasions, it has been used at the University Hospital, three times for thrombo-angiitis obliterans and once for Raynaud's disease, peri-arterial sympathectomy has been a complete failure. The natural assumption is that these diseases are also outside of the pale of peri-arterial sympathectomy.

While the series is by far too small to be staged as an infallible argument against peri-arterial sympathectomy; it should, when taken in conjunction with the research findings of Palma,[6] be regarded as very suggestive. This investigator divided the sciatic nerve of dogs to cause trophic ulcer. Either prior to or coincidently with the neurectomy, he performed a peri-arterial sympathectomy on the corresponding femoral artery. In not a single instance did the sympathectomy hinder the appearance of the ulcer, or cause it to heal.

[5] Jeanneney and Mathey-Cornat: Arch. Franco-Belges de Chir., Brussels, 1924, vol. xxvii, p. 884; and also abst. Jour. Amer. Med. Assn., Chicago, 1925, vol. lxxxiv, p. 1388.

[6] Palma: Ann. ital. di chir., 1924, vol. iii, p. 811; also abst. Surg., Gyn. and Obst., Chicago, 1925, vol. xl, supplement, Internat. Abst. of Surg., p. 369.

Want of success, Palma attributed, to a sleeve of cicatricial connective tissue forming in the arterial tract and this, in retracting, interfered with the functioning of the artery and seemed to be of importance in diminishing the amount of blood delivered to the parts lying beyond the operative site. Furthermore, Palma found that in some cases obliterating endarteritis resulted from the injury to the vessel walls; which in association with the constriction of the arterial walls by the cicatricial sleeve, he thought, was sufficient to explain the failures and the transitory effect of peri-arterial sympathectomy.

Whether peri-arterial sympathectomy is to survive the first wave of enthusiasm accorded it, cannot be answered at the present time. Certainly before it commands anything like popular confidence, many more examples of its successful application must have come to hand. In the meanwhile, until more case-reports are available for careful study and critical analysis, a spirit of fair-play demands that all preconceived opinions—either for or against the operation—should be held in leash.